culture down to the time when successive societies attained literacy."

This is an ambitious design that quite naturally, in a work of 284 pages, calls for a great deal of compression. Although Clark bases his discussion almost entirely on concrete but fragmentary evidence, he found it impracticable to incorporate or even summarize the nature of the evidence itself. What he has done is to present a reasonably coherent picture of human cultural history from the earliest appearance of man as a tool-making animal to the emergence of adequately written history in different parts of the world at different times.

In a disarming paragraph Clark signals his awareness that "the varying intensity of archaeological research in different parts of the world, the author's unequal reading, and the insistent progress of knowledge, which modifies conclusions almost before they can be set down, all help to distort the picture."

Paradoxically, although the author specifically eschews an attempt at artificial evenness of treatment, the actual structure of the book, by virtue of its relatively even chapter lengths, superficially approximates just that, and results in a certain lack of balance.

The first chapter, entitled "Man's place in nature," is fairly evenly divided between physical environment and biological evolution. The next two chapters, which span 50 pages, discuss Lower Paleolithic cultures and their survivals, on the one hand, and advanced Paleolithic and Mesolithic cultures on the other. Here Clark is dealing with his own specialities and is at his best. "The invention of farming and the rise of Mesopotamian civilization" occupies 23 pages, and "Ancient Egypt and the later prehistory of Africa" only 20 pages. By contrast, "Neolithic peasants and arctic hunter fishers" in Europe runs to 28 pages, and "From Mycenae to the age of expansion" runs to 33 pages. Since both of these chapters are subdivisions of a broader topic, the foundations of European civilization, this disproportionate bias is understandable, particularly since our archeological evidence for much of Continental Europe and the Mediterranean is fairly complete and therefore quite confusing.

On the other hand, to treat India and the Far East, including China, Southeast Asia, Indonesia, and the Philippines, as well as Japan and Northeast Asia, in 32 pages, the New World, encompassing North America, Mesoamerica, and South America, in 28 pages, and Australia and the Pacific in 11 pages is likely to cause the professionals who specialize in those areas to gasp.

It is obvious that Clark could do no more than present his own interpretations and that only occasionally could he outline some area of disagreement, and it is also obvious that he had to omit much relevant material. This, then, is the kind of book about which the expert can and does say, "This is excellent, stimulating and informative, but for my area. . . ."

It is not a book to read at one sitting, for the compression of material has resulted in a density of style. Each chapter must serve as a point of departure for further reading or lectures to fill in the gaps, repair omissions, and assess conflicting interpretations. But as an introductory text that leads the reader into unfamiliar territory this book deserves a place on the reference shelf of the professional archeologist, the serious student, and the interested layman.

ROBERT W. EHRICH
Department of Sociology and Anthropology, Brooklyn College

Science Since Babylon. Derek J. de Solla Price. Yale University Press, New Haven, Conn., 1961. 149 pp. $4.50.

The author delivered five of the six chapters of this book as public lectures in a prolegomenon to a program in the history of science and medicine at Yale. He wisely concentrated attention on certain "crises," in the study of which he has himself made valuable and important discoveries or suggestions. His enthusiasm is infectious and will convey in print, as it must surely have done by the spoken word, the variety of opportunities that await the scholar in this, the newest field of historiography.

Price tells of the complements of Greek geometrical model and Babylonian computation in Ptolemy's *Almagest*. The comparisons of clockwork between China and the West is a well-told detective story, containing clues for a fuller tale of cultural relations. A chapter on the technological background of American science takes a more generous view than has been fashionable of our national heritage in this field. An essay on discovery in radiation grapples with the problem of what to do with recent history in science. There is a most suggestive study of the quantitative growth of science. The book closes with an appeal for institutionalization of what the author calls "humanities of science," of which the reader is to take the five substantive chapters as samples. I find this summons a little apocalyptic and would prefer to refuse the choice of all or nothing. And perhaps one need not make it in order to enjoy and profit from the excellent observations and curious facts that abound in a brief, delightful, and intriguing book.

CHARLES COULSTON GILLISPIE
Department of History, Princeton University

Anatomy of Monocotyledons. vol. 1, *Gramineae*. Charles Russell Metcalfe. Oxford University Press, New York, 1960. lxi + 731 pp. Illus. $13.45.

A more appropriate title for this excellent reference work would have been "Leaf Anatomy of the Gramineae." Leaf anatomy is emphasized because "in the vegetative organs of the Gramineae the most important characters are to be found in the leaf." The volume is the culmination of over 10 years of research by Metcalfe, and it records the data for 206 genera and 413 species examined. In addition, the literature has been summarized and blended with the author's results, so that 345 genera have been treated.

There are chapters on the general morphology of the grass plant, on the diagnostic microscopical characters, and on the leaf structure and taxonomy of grasses, but the major part of the book records the details of leaf anatomy. The genera are arranged alphabetically under each of two divisions: the genera not in the Bambuseae and genera in the Bambuseae. The diagnostic characters of each genus are followed by the detailed anatomy of selected species. This usually includes only the abaxial epidermis of the leaf and a transverse section of the lamina, but sometimes the anatomy of the culm and other parts are given. The source of the material examined is indicated for each species. Sometimes it is from plants cultivated at Kew and sometimes from a specific herbarium specimen. Additional information from the literature is considered separately.

Special features of the book include lists of genera and species in which certain diagnostic characters occur (40 pages), an extensive bibliography (20 pages), and 29 plates of fine drawings which illustrate the anatomical characters.

There is little said of phylogeny for "We . . . recognize that the grasses appear to represent an advanced group of monocotyledons, but . . . we can say little or nothing about lines of phylogenetic advance within the family." "It seems as if it will be more profitable, at this stage, to concentrate on discovering natural taxonomic groups rather than to speculate concerning the phylogeny of the grass genera as we know them today."

The book is indispensable to agrostologists whose research interests are in taxonomy or related fields.

JASON R. SWALLEN
Department of Botany,
U.S. National Museum,
Smithsonian Institution

Humid Tropics Research. *Problems of Humid Tropical Regions.* 102 pp. Illus. $3. *Study of Tropical Vegetation.* Proceedings of the Kandy Symposium, jointly organized by the Government of Ceylon and UNESCO. 266 pp. $6. UNESCO, Paris, 1958.

These bilingual volumes, published by UNESCO on the occasion of the preparatory meeting of the International Advisory Commission on Humid Tropics Research, are the first publications of the Humid Tropics Research Program. F. R. Fosberg (U.S. Geological Survey) attended this meeting and is now the member for the United States.

Problems of Humid Tropical Regions is a collection of six reports commissioned at the eighth session of UNESCO as the first part of a program "to promote the co-ordination of research on scientific problems relating *inter alia* to the humid tropical zone and to promote international or regional measures to expand such research."

There are three general reports. One by Felisberto C. Camargo (Servico Nacional de Pesquisas Agronomicas, Rio de Janeiro) deals especially with his siltation techniques that increase the amount of flood-plain lands. These flood plains are of high agricultural value, in contrast to the relatively sterile "high ground." A second paper is by Enrique Beltran (Instituto Mexicano de Recursos Naturales Renovables, Mexico) and is concerned with the Caribbean region. Beltran's report surveys the natural resources of the lands about the Caribbean Sea and includes a 297-title bibliography. In the third paper, E. K. Janaki Ammal (Central Botanical Laboratory, Botanical Survey of India) reports on Burma, Ceylon, India, and Pakistan.

There are three special reports. One, by G. Marlier (then of the Institut pour la recherche scientifique en Afrique centrale in the former Belgian Congo) is on biological problems of tropical humid Africa. A second, by A. P. Kapur (Zoological Survey of India, Calcutta), is on entomological problems in South Asia, with separate discussions on major crop plants, forests, stored products, and human health, and with a 376-title bibliography. The third is on the Philippines and the state of its water resources development, with considerable discussion of the interlocking problems of agriculture, fisheries, soil erosion, and forestry.

Both the general and the special reports in this volume are valuable contributions to regional geography, with varied emphasis on special problems.

For those interested in world vegetation, *Study of Tropical Vegetation* takes its place on the same shelf with Rübel's *Pflanzengesellschaften der Erde* and Richard's *Tropical Rain Forest. Study of Tropical Vegetation* is based on the Kandy Symposium, which was sponsored jointly by Ceylon and UNESCO, and is comprised of 26 papers; each paper is a summary and evaluation of existing vegetation knowledge, includes a valuable bibliography, and points to the needs for further research. The following areas are covered: India and Burma (Puri); Indonesia (Dilmy and Kostermans); Ceylon (de Rosayro); Malaya (Wyatt-Smith); British Guiana and Nigeria (Richards); the Philippines (Bedard); the islands of Oceania (Fosberg); eastern India (Chatterjee); Malaysia (van Steenis); Madhya Pradesh and the Gangetic Valley of India (Misra); Singapore (Purseglove); India (Bharucha); Ceylon (MacFadden, who emphasizes aerial techniques); Ceylon (Holmes, who stresses the role of the old civilization in determining the present dry evergreen forest); Ivory Coast (Mangenot); Papua and Northwest New Guinea (Taylor and Stewart, who apply the excellent techniques developed by the commonwealth Scientific and Industrial Research Organization of Australia for regional resources surveys); India (Janaki Ammal); Pakistan (Hedayetullah); Borneo (Kostermans); Sarawak (Browne); British North Borneo (Wood); Australia (Webb); Ceylon grasslands (Senaratna); Viêt-Nam (Schmid); and Sarawak and Brunei (Anderson). Basic principles of rain forest sociology are discussed by van Steenis.

There follows a series of five special papers and discussions—ecological factors (Mangenot); vegetation types (Bharucha); the climax (Richards); reproduction in forest openings (van Steenis); and mapping (Fosberg). The volume includes generalized vegetation maps for Ceylon, the Ivory Coast, Pakistan, India, and Burma. It closes with 14 recommendations concerning national and international activities in this field.

Study of Tropical Vegetation is a milestone towards the coordination of vegetation thought and research on an international plane, even though it shows the urgent need for further coordination and for the eventual development of a mature international science. The nonpartisan reader will be impressed with the very considerable attention given in the papers and recorded discussions to the relative merits of "Clementsianism" (probably derived from the Weaver and Clements text, now rarely used in America) and the SIGMA (Station Internationàle de Géobotanique Méditerranèene et Alpine) school (which originated in southern France), with the former developing into hearty subarguments on the pros and cons of monoclimax and polyclimax theory. One senses that these workers are groping for a school, a philosophy, a methodology, and that all they have to choose from are the American and West European traditions, both of which have their limitations in the tropics. (But no less so than in temperate regions!) I sometimes wonder—I strongly suspect—that the odd theories and philosophies of these two schools are actually unconsidered by these workers. What appeals in the SIGMA school is the small-scale quadrat method (which, after all, is not its unique feature) and what appeals in Clementsian thought are the large regional units (which, again, are not unique to that group). And the two approaches are by no means incompatible. Rather, on these grounds, they are complementary. While read-